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birds. The department hopes that counts will be continued on all land where they have previously been made, and it especially desires to obtain also series of counts indicating the bird life on the plains; on the deserts, both with and without irrigation, and in the southern and western states.

It might be well to select new areas where physical conditions are not likely to change much for a number of years, so that if succeeding annual counts show changes in bird population it will be known that they are not due to changed environment brought about by man. On the other hand, there is much to be learned regarding the adaptation of birds to changes of environment; any area therefore on which reports can be made year after year may be chosen, even though conditions are likely to change. Possible inability to repeat a count on the same tract need not, however, deter any one from making the count this year.

The height of the breeding season should be chosen for this work. In the latitude of Washington, D. C., at latitude 39 degrees, May 30 is about the right date for the first count. In the latitude of Boston the work should not begin until a week later; while south of Washington a date still earlier than May 30 should be selected. The department wants to learn how many pairs of birds actually nest within the selected area. Birds that visit the area only for feeding purposes must not be counted, no matter how close their nests may be to the boundary line.

Several kinds of counts are needed for a study of the relative abundance of birds under changing and stationary conditions. It is hoped that many persons interested in bird life will make one or more counts this season. If only one count is made, the tract selected should represent average farm conditions for the locality, should not have an undue amount of woodland or orchard, and should contain not less than forty acres a quarter of a mile square nor more than eighty acres. If there is an isolated piece of woodland of from ten to twenty acres conveniently near, a separate count of the birds nesting there will be useful in addition to the count on the rest of the farm. In this case the report, in addition to specifying

the size and exact boundaries of the area, should give the principal kinds of trees, and whether there is much or little underbrush.

A third count is desired of some definite area of woodland, which is part of a larger timbered tract. Still a fourth count, supplementary to these is needed. The average farm in the northeastern states contains about one hundred acres, and the average count hitherto has been of the birds nesting on the fifty acres of the farm nearest to and including the farm buildings. It is now necessary to obtain counts also of the remainder of the farm, the wilder part containing no buildings, especially on the same farms where counts about the buildings have already been made. Besides these, counts on any other kinds of land are much desired for comparison.

Any one who is willing to do this work is requested to send his name and address to the Biological Survey, Washington, D. C. Full directions for making a count and report blanks will be sent in time for plans to be made before the actual time for the field work. Since the bureau has no funds with which to pay for this work, it must depend on the services of voluntary observers.

THE CHEMICAL EXPOSITION¹

THE Eighth National Exposition of Chemical Industries will be held this year in the Grand Central Palace, New York, during the week of September 11 to 16, inclusive. It will follow immediately upon the fall meeting of the American Chemical Society. The early date will give college and university men an opportunity to see the exhibits before the beginning of the college year. There is much in this coming exposition to interest university men. Each floor has exhibits of laboratory apparatus, and one floor has a considerable group of this type of equipment. Many new pieces of apparatus, new chemical compounds, and other material and instruments will be found here.

The interests for industrial chemistry in the exposition are wide and varied: from raw materials in minerals, ores, manufacturing crudes or by-products, through the range of ma-

¹From the *Journal of Industrial and Engineering Chemistry*.

chinery, apparatus and equipment and instruments for control, precision, recording, gaging and measuring, and a thousand other items used in converting the raw materials into the finished products. The finished products themselves, whether they be organic, inorganic, solid, liquid, gaseous, or of any other form, are all to be there. Many new things upon which manufacturers were working when the war ended and which have been more leisurely perfected since will be shown for the first time. Industrial progress continually calls for greater advancement and perfection in manufacture, and each year sees many notable improvements upon the exhibits in the exposition. Counting only these, the time of technical and business men is well spent in inquiring into the exhibits. One exhibitor, who for the past few years has been devoting time to the perfection of a new form of apparatus, said the other day that it is now when men have time to spare for consideration of these things that he expects a considerably larger and more interested attendance in his booth. "When the plants are idle as they are now, the most progressive companies are examining into our apparatus, and a remarkable thing is that we are making some installations in plants which are now closed, so that when they begin work they will be in better position than ever and have an advantage in taking this opportunity to prepare to reduce their costs for the future. I'm looking for many more such openings through our exhibit and with considerable enthusiasm for the entire exposition."

The managers report that three full floors of the Grand Central Palace are already taken for the exposition and a part of a fourth. They expect all space will be engaged before the opening date. Already, 303 exhibitors have contracted for space.

The exposition will contain two interesting special sections: one upon the subject of fuel economy, where exhibits intended for the more efficient use of fuel, its combustion, distribution, or control will be made. The other will deal with shipping containers, including the container itself, whether of metal, wood, fiber, paper, glass or in coopeage products of slack and tight barrels, tanks and towers, and with

machinery for packaging, labeling, handling, and conveying the packaged material and marking it ready for final shipment.

Work upon the program has not yet been actively undertaken but it may be expected to compare more than favorably with the high standards of the preceding expositions. The management have returned to the Grand Central Palace with their offices, and all inquiries should be directed there.

FELLOWSHIPS IN MINING RESEARCH

THE cooperative department of mining engineering of the Carnegie Institute of Technology, Pittsburgh, announces the offer of two fellowships in mining research, and two in teaching and research, in cooperation with the Pittsburgh Experiment Station of the United States Bureau of Mines. The fellowships are open to the graduates of universities and technical schools who are properly qualified to undertake research investigations. The value of each fellowship is \$750 per year of ten months beginning on July 1 for the position of research fellow and on August 1 for teaching fellow.

Investigations will be on the following subjects: (1) Acid Mine Waters: (a) physical-chemical study of the mechanism of corrosion in acid mine water; (b) neutralization with limestone, blast furnace slag, etc.; (c) recovery of iron oxide for gas purification and other purposes; (d) purification for use in boilers. (2) Shooting Coal: (a) factors in shot firing which favor the production of lump coal; (b) effect of location, size, and depth of bore holes; (c) kind of explosive; (d) sequence of firing; (e) method of charging and firing; (f) method of cutting coal. (3) Spontaneous Combustion and Coal Storage: (a) effect of size of coal; (b) effect of moisture; (c) effect of anthraxylon and attritus; (d) action of various forms of sulphur. (4) Geology: (a) relation of relative proportions of anthraxylon and attritus in coal to its coking properties and by-product yield; (b) correlation of coal seams by microscopic characteristics; (c) constitution of coal seams in western Pennsylvania. (5) By-products Coking: (a) determination of the heat of carbonization of coal; (b) determina-